

REMARKS/ARGUMENTS

Claims 18 and 21-27 are pending in the application and stand rejected.

Claims 24, 18, 21 and 25-27 are rejected under 35 USC 103 as being unpatentable over Uemura (US 6,331,450) in view of Sasaki et al. (JP 2002-9111A) (hereinafter "Sasaki") and further in view of Yamaguchi et al. (US 6,610,934) (hereinafter "Yamaguchi").

Claims 22 and 23 are rejected under 35 USC 103 is being unpatentable over Uemura in view of Sasaki and further in view of Yamaguchi and further in view of Kajiwara et al. (US 6,774,466) (hereinafter "Kajiwara").

Claims 18 and 24 are amended. Among other places, support for the claim amendments can be found at page 17 of the application as filed. No new matter has been added.

As discussed below, Applicant respectfully submits that the cited references failed to disclose or suggest each and every element as set forth in the pending claims. In particular, the cited references do not disclose a relationship between first, second, and third temperatures as claimed. Accordingly, reconsideration and allowance is respectfully requested.

Claim 24

Claim 24 recites a method of making a semiconductor device. The method comprises "(a) sealing the semiconductor device in a package by surrounding it with thermosetting epoxy resin and thermally curing the resin at a first temperature; (b) baking the thermosetting epoxy resin at a second temperature not higher than the first temperature; (c) further baking the thermosetting epoxy resin at a third temperature higher than the first temperature" (emphasis added). The cited references do not disclose or fairly suggest at least steps (a)-(c).

The Office Action cites Uemura as teaching a method of making a semiconductor device in which a resin is baked and cured. See, Office Action at ¶2. It is acknowledged that Uemura does not disclose a further baking step as recited above, nor does Uemura disclose the use of first, second, and third temperatures. However, the Office Action indicates that Sasaki

teaches further baking performed at a temperature that is higher than a first temperature used for curing the thermosetting epoxy resin. Applicant respectfully disagrees.

At paragraph 12, Sasaki discloses that a resin is thermally cured by increasing the curing temperature to 260° C and subsequently allowing the curing temperature to decrease to a temperature between 200-240° C (preferably 220° C). The resin is subsequently cured at 260°C (the same temperature used in the initial heating). Sasaki thus discloses that the resin is heated to a first temperature, allowed to cool, and then reheated to the same first temperature. Accordingly, Sasaki does not disclose or fairly suggest “further baking the thermosetting epoxy resin at a third temperature higher than the first temperature” (emphasis added).

More broadly, the combination of Uemura and Sasaki thus does not disclose or suggest at least a relationship between first, second, and third temperatures as claimed. In other words, the references do not disclose or even suggest that a third temperature is the highest temperature obtained during the whole of the three-part resin curing process. Also, the cited references do not disclose or fairly suggest that, after decreasing the temperature of the resin to the second temperature (lower than the first temperature), the resin is further baked at a third (highest) temperature.

By obtaining the highest temperature during the whole of the resin curing process after decreasing the temperature of the resin to the second temperature, the resin is prevented from being heated repeatedly by the highest temperature throughout the resin curing process. Unlike Sasaki, the claimed invention does not heat the resin to the highest temperature both before and after a step of baking at a lower temperature. Therefore, with the claimed invention, thermal deterioration of the resin and the semiconductor chip in the resin is restrained while restraining the residual stress and securely curing the resin. None of the cited references disclose at least curing and baking a thermosetting epoxy resin at first, second, and third temperatures as claimed.

In addition, Applicant respectfully submits that there is no motivation for modifying Uemura with Sasaki and Yamaguchi. The Office Action notes that it would be obvious to modify Uemura for the purpose of “hardening and curing the binder layer.” See, Office Action at ¶2 (page 3). However, as disclosed by Uemura, the baking step is performed at

a fixed temperature until the resin is "completely cured". See, Uemura at col. 7, lines 10-11. It is therefore respectfully submitted that a person of skill in the art would not be motivated to modify Uemura for the purpose of hardening/curing the resin. Reconsideration and allowance of claim 24 is respectfully requested.

Claims 18, 21-23, and 25-27

Claims 18, 21-23, and 25-27 depend from claim 24. Each dependent claim incorporates all of the limitations of claim 24 as previously discussed. Accordingly, claims 18, 21-23, and 25-27 are believed allowable over the cited references for at least the reason that they depend from an allowable base claim.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 858-350-6100.

Respectfully submitted,



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